

Appl. No. 09/623,604
Amdt. Dated July 29, 2004
Reply to Office action of March 8, 2004

Amendments to the Specification:

Please insert the following heading on page 1, after the title and before paragraph [0001]:

BACKGROUND OF THE INVENTION

Please insert the following heading on page 1, after paragraph [0002] and before paragraph [0003]:

SUMMARY OF THE INVENTION

Please replace paragraph [0007] on page 3, lines 27-30 with the following replacement paragraph:

[0007] One embodiment of the invention, given as a purely illustrative example, will be described with the help of the following figures and will make it easier to understand its characteristics, aims and advantages[[:]].

Please insert the following heading on page 4, before the first paragraph which is paragraph [0008]:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace paragraph [0008] on page 4, lines 1-2 with the following replacement paragraph:

[0008] ← fFigure 1 is a general view of the device and its location,

Please replace paragraph [0009] on page 4, lines 3-5 with the following replacement paragraph:

[0009] ← fFigures 2 and 3 are representations of the drill holes intended for the guide cable and also show adjacent equipment,

Please replace paragraph [0010] on page 4, line 6 with the following replacement paragraph:

[0010] ← fFigure 4 is a single view of the support cable,

Please replace paragraph [0011] on page 4, lines 7-8 with the following replacement paragraph:

[0011] ← fFigures 5 and 6 are views of the crosspiece to which the guide cables are hooked,

Please replace paragraph [0012] on page 4, lines 9-10 with the following replacement paragraph:

[0012] ← fFigures 7 and 8 are views of the opening in the slab,

Please replace paragraph [0013] on page 4, line 13 with the following replacement paragraph:

[0013] ← fFigure 9 is an enlargement of figure 8.

Please insert the following heading on page 4 after paragraph [0013] and before paragraph [0014]:

DESCRIPTION OF EXAMPLE EMBODIMENT

Please replace paragraph [0016] on page 5 beginning at line 16 and continuing on page 6 through line 21 with the following replacement paragraph:

[0016] Figure 2 represents a front view of a guide winch 10. Its motor is referenced 15 and drives the horizontal rotation axle 16 of a drum 17 by a kinematic linkage comprising a reducer 18, a torque limiter 19 and a sensor 20 for measuring torque [[20]]. The aim of the torque limiter 19 is to prevent imposing too high a traction on the guide cable 11 by uncoupling the motor 15 and, if one so wishes, the sensor 20 makes it possible to evaluate the lengthening of the guide cable 11 consecutive to this traction; it is thus linked to the control system 14. Finally, the axle 16 is provided with a resolver 21, or another sensor capable of measuring the rotation angles and thus the rolling and unrolling of the guide cable 11. The motor 15 and its output shaft (coaxial with axle 16) are supported by bearings 22 of a frame 23 fixed on the slab 2, and the rotation axle 16 of the drum 17 is mounted on another pair of bearings 24 of another frame 25, also fixed on the slab 2. The drill hole 12 is equipped with a sleeve 26 whose first function is to re-establish the seal of slab 2 at this point and, for this, comprises a first washer 27 at its lower extremity and a second washer 28 at its upper extremity. Nonetheless the guide cable 11 has to pass through the sleeve 26 and the washers 27 and 28; this is why these two

washers are provided with diametral slits 29 and 30, which are arranged in such a way as to cross each other in order to avoid radiation originating from the waste 5 and 6 crossing through the drill hole 12 too easily. Another aim of the slit 30 of the upper washer 28 is to allow the guide cable 11 to pass through without friction, whatsoever the part of the drum 17 from which it has been unrolled: it is thus parallel to the unrolling edge of the drum 17. A crossbar 31, called an anti-run-back, is placed against this unrolling edge so as to apply the guide cable 11 by pressure, for a reason which will be explained below.

Please replace paragraph [0018] on page 6 with the following replacement paragraph:

[0018] Figure 3 is a side view of the same parts, but it will serve essentially to illustrate the sleeve [[12]] 26 in detail.

Please replace paragraph [0019] on pages 7-8 with the following replacement paragraph:

[0019] The lower washer 27 carries a return box 33 composed of rollers 34 in the form of a dual wheel which defines a groove 35 between them and through which the guide cable 11 passes. The groove 35 is curved, with a vertical upper extremity and a horizontal or oblique lower extremity, in order to allow the guide cable 11 to change from a vertical length, where it crosses drill hole 12 to an oblique or horizontal length under the slab 2 where it remains sufficiently high above

the level of the liquid waste 6. The return box 33 should be directed towards the crosspiece 13: the sleeve [[12]] 26 is then set on the slab 2 in such a way as to pivot, and a motor 36, mounted on a frame 37 fixed to the slab 2, drives it by the intermediary of a reducer 38, a pinion 39 and a toothed crown 40 mounted on the periphery of the sleeve 12. An encoder 41 informs the control system 14 of the movements made by the sleeve 26. Reference 42 shows a handle fixed to the upper washer 28 which makes it possible to extract the sleeve 26 from the drill hole 12 or to let it descend. Finally, it is to be noted that the rotating and extractable sleeve 26 is engaged in a fixed sleeve 71 coating the drill hole 12 and that there is an intermediary sleeve 72 slipped between them. This intermediary sleeve 72 pivots inside the fixed sleeve 71 by sliding on a pair of O-rings 73; in addition, there is play between the sleeve 26 and the intermediary sleeve 72. Thus, the return box 33 is made to rotate by the guide cable 11 and this drives the sleeve 26 and the intermediary sleeve 72, which pivots with little friction on the fixed sleeve 71. Stops 74 make it possible to stack the sleeve 26 on. the intermediary sleeve 72. Lugs 75 engaged in a circular groove of the fixed sleeve 71 enable it to prevent the intermediary sleeve 72 from falling into the pit 4.

Please replace paragraph [0020] on page 8 with the following replacement paragraph:

[0020] The lifting winch 9 of the support cable 8 is shown in figure 4. It also comprises a drum 43 with horizontal rotation axles 44 mounted on a pair of

bearings 45 of a frame 46 fixed on the slab 2, and a motor 48 drives through the intermediary of a reducer 49. An encoder 50 makes it possible to measure the rotations of the axle 44 and to transmit this to the control system 14. The motor 4[[9]]8 is also supported by bearings 51, on part of the frame 46.

Please replace paragraph [0021] on pages 8-9 with the following replacement paragraph:

[0021] An essential element of the construction is that the drum 43 has its outside surface notched by a helicoidal groove 52 intended for rolling the support cable 8 in a single layer, which then follows the groove 52 along the drum 43 when it is rolled. An antislip crossbar 53 analogous to that 31 of the guide winches 10 ensures this function by pressing the lifting cable 8 as soon as it approaches the groove [[43]] 52 and thus forcing it to follow its oblique direction. It is to be noted that such helicoidal grooves already exist but in general their aim is to prevent what is called the build-up (tangling) of a cable unwound at great speed and of great length, in arranging its first layer and then each of the following ones so that they are evenly superposed; cables 8 and 11 are much shorter here and the intended aim is simply to spread them in a single layer so that one turn of the drum 17 or 43 unwinds one determined and unchanging diameter coil of cable.

Please replace paragraph [0023] on pages 9-10 with the following replacement paragraph:

[0023] The crosspiece 13 is seen from above in figure 5. [[i]]It is composed of four appendices 59 directed towards the guide cables 11 and terminated by vertical rings 60 pivoting around a vertical axis 61, in which the loops 62 at the ends of the cables 11 are engaged. This mounting makes it possible to direct the crosspiece 13 with high precision. In addition, the appendices 59 are provided with rollers 63 on their upper faces, as well as the body 64 of the crosspiece 13 which unites the appendices 59 together. These faces are convex so that the support cable 8 rests on the rollers 63 along a suitable length, as figure 6 shown as a cross-section through one of the arms 59 makes perfectly clear; in addition, care has to be taken to shape these sliding surfaces of the support cable 8 with concavities between appendices 59 adjacent to the hooking of the guide cables 11, in such a way that the support cable 8 is encouraged to enter into the bottom of one of the grooves 65 thus formed and to remain there even when there are oscillations: it is then placed with high precision on the crosspiece 13 and slides without excessive friction.

Please replace paragraph [0025] on pages 11-12 with the following replacement paragraph:

[0025] The operation of the device can be described fairly simply: once it has been decided to take the grab 7 to a defined point in the pit 4, it is lowered slightly through the opening 3 after having placed the crosspiece 13 not far from it, in such a way that the support cable 8 passes in front of the groove 65 which is

directed towards the position to be reached. Then certain guide cables 11 are rolled up while others are unrolled to displace the crosspiece 13 in such a way as to place the support cable 8 in the chosen groove 65 and then to move the grab 7 towards the chosen position; these movements are accompanied by progressive unrolling of the support cable 8 to prevent the grab 7 rising up to the crosspiece 13; the control system 14 constantly calculates the length of each of the guide cables 11 thanks to the information from the resolvers 21, then the position of the crosspiece 13 and that of the grab 7; it also orients the sleeves 26. It can take into account the lengthening of the guide cables 11 consecutive to their traction and of the position of the groove 65 on which the lifting cable 8 slides, to improve the calculation of the position of the grab 7. It takes care not to apply excessive force on the guide cables 11; however the torque limiters 19 make it possible to avoid excessive traction and to relax the cables 11 until the tractions ~~have~~ has disappeared. When the grab 7 overhangs the position required, the control system 14 continues to actuate the lifting winch 9 until the grab 7 has been lowered to the height required; it takes into account the length of support cable 8 which has already been unrolled and which has been indicated by the ~~sensor~~ encoder 50. The jacks 55 can then be put into action to close the claws 56 and seize a sample of the waste, after which the preceding operations are repeated in reverse to bring the grab 7 back underneath the opening 3 and to lift it up.